

Application No. 09/862,593
Docket No.: Shipley 03-16 (ACT - 135)

Art Unit: 1756
Examiner: Sagar, Kripa

Please amend Fig. 8(f) as marked in red on the copy attached hereto. Reference numeral "806a" is changed to "806b" to comport with the use of "806b" in Fig. 8(e).

Applicant respectfully requests that the Examiner approve and enter the above drawing changes. No new matter is added.

In the Claims:

Please add new claim 31.

31. The method as claimed in claim 6, wherein the etched away portions of the substrate form a V-shaped groove.

Please amend the claims to read as follows. A marked-up copy of the amended claims is provided in the Attachment.

1. (Amended Once) A method of fabricating an optical device having at least one integrated waveguide and at least one micro-machined feature, comprising:

depositing a first mask layer over a surface of a substrate structure, and patterning the first mask layer to obtain a mask pattern over the surface of the substrate structure;

conducting a first etching process for obtaining the at least one integrated optical waveguide core at the surface of the substrate structure;

depositing a second mask layer over the at least one integrated optical waveguide core, the second mask layer having an end that is aligned with and at least partially overlaps a portion of the first mask layer; and

conducting a second etching process for obtaining the at least one micro-machined feature at the surface of the substrate structure, wherein the first mask pattern is used as a mask in both the first and second etching processes.

6. (Amended Once) A method of fabricating an optical device, comprising:

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forming a lower cladding material layer within a recess of a substrate;
forming a core material layer over the lower cladding material layer and a surface of the substrate;
patterning a first mask layer over the core material layer, wherein the first mask layer is patterned such that a first portion extends over the lower cladding material layer, and such that a second portion extends over the surface of the substrate adjacent to the lower cladding material layer;
etching away the core material layer using the first mask layer as a mask such that a first core material portion remains below the first portion of the first mask layer and a second core material portion remains below the second portion of the first mask layer;
removing the first portion of the first mask layer to obtain a resultant structure and depositing an upper cladding material layer so as to cover a surface of the resultant structure;
patterning a second mask layer over the upper cladding material layer, wherein the second mask layer extends across the lower cladding material layer and has an end which is aligned with and at least partially overlaps the second portion of the first mask layer;
etching away the upper cladding material layer using the second mask layer as a mask to expose a part of the second portion of the first mask layer; and
etching away portions of the substrate using the exposed part of the second portion of the first mask layer as a mask.

12. (Amended Once) A method of fabricating an optical device, comprising:

forming a lower cladding material layer within a recess of a substrate;
forming a core material layer over the lower cladding material layer and a surface of the substrate;
patterning a first mask layer over the core material layer, wherein the first mask layer is patterned such that a first portion extends lengthwise over the lower cladding material layer, and such that a second portion extends over the

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substrate surface adjacent to the lower cladding material layer and defines an elongate opening which is aligned in a lengthwise direction with the first portion of the first mask layer;

etching away the core material layer using the first mask layer as a mask such that a first core material portion remains below the first portion of the first mask layer and a second core material portion remains below the second portion of the first mask layer;

removing the first portion of the first mask layer to obtain a resultant structure and depositing an upper cladding material layer so as to cover a surface of the resultant structure;

patterning a second mask layer over the upper cladding material layer, wherein the second mask layer extends across the lower cladding material layer and has an end which is aligned with and at least partially overlaps the second portion of the first mask layer;

etching away the upper cladding material layer using the second mask layer as a mask to expose a part of the second portion of the first mask layer; and

etching away portions of the substrate using the exposed part of the second portion of the first mask layer as a mask.

13. (Amended Once) The method as claimed in claim 12, wherein the first mask layer is planar.

19. (Amended Once) A method of fabricating an optical device, comprising:

forming a lower cladding material layer within a recess of a substrate;

forming a core material layer over the lower cladding material layer and a surface of the substrate;

patterning a first mask layer over the core material layer, wherein the first mask layer is patterned such that a first portion extends over the lower cladding material layer, and such that a second portion extends over the substrate surface adjacent to the lower cladding material layer;

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patterning a second mask layer having an opening aligned over the lower cladding material layer;
etching away the core material layer using the second mask layer and the first portion of the first mask layer as masks, wherein a first portion of the first core material layer remains below the first portion of the first mask layer, and a second portion of the first mask layer remains below the second mask layer;
removing the second mask layer and the first portion of the first mask layer to obtain a resultant structure and depositing an upper cladding layer so as to cover a surface of the resultant structure;
patterning a third mask layer over the upper cladding material layer, wherein the third mask layer extends across the lower cladding material layer and has an end which is aligned with and at least partially overlaps the second portion of the first mask layer;
etching away the upper cladding material layer using the third mask layer as a mask to expose a part of the second portion of the first mask layer; and
etching away portions of the substrate using the exposed part of the second portion of the first mask layer as a mask.

25. (Amended Once) A method of fabricating an optical device, comprising:

forming a lower cladding material layer within a recess of a substrate such that an upper surface of the lower cladding material layer is below a surface of the substrate;
forming a core material layer within the recess and over the lower cladding material layer;
patterning a first mask layer over the core material layer and a surface of the substrate, wherein the first mask layer is patterned such that a first portion extends over the core material layer, and such that a second portion extends over the surface of the substrate surface adjacent to the core material layer;